

MORE ABOUT

Production of CFCs (ChloroFluorocarbons) such as R-502 ceased in many countries on December 31st, 1995 in accordance with the requirements of the Montreal Protocol. HCFCs (HydroChloro-FluoroCarbons) such as R-22 that helped the phase-out of CFCs, will finally be phased-out depending on local regulations.

Arkema developed a full range of long-term solutions that can be applied in any refrigeration or air-conditioning systems. These solutions allow the construction of efficient installations and, being HFCs, they do not deplete the ozone layer.

FORANE[®] 507 is well suited to commercial, transport and industrial refrigeration, and is available worldwide through Arkema and its distribution network.

FORANE[®] 507 can be used in refrigeration applications from -45°C to +15°C (evaporation temperature) in new installations and offers similar or better performance compared to R-502 and R-22 without any specific handling concern.

CHARACTERISTICS

FORANE[®] 507 complies with the most stringent criteria in terms of non-flammability and non-toxicity. Its use is not subject to any particular constraint, compared to R-502.

REFERENCES

FORANE[®] 507 is recognised by all major equipment manufacturers, offering a complete range of commercial equipment (compressors, display cases, reefer containers...).

Properties	Units	R-502	FORANE [®] 507
Components	-	R-22, R-115	R-125, R-143a
Composition	% weight	48.8/51.2	50/50
Molecular weight	g/mol	111.6	98.8
Bubble temperature (at 1,013 bar a)	°C	-45.4	-47.1
Temperature glide (at 1,013 bar a)	K	0	0
Saturated liquid density (25 °C)	kg/dm ³	1.217	1.04
Saturated vapour density (at 1,013 bar a)	kg/m ³	6.22	5.51
Critical temperature	°C	82.1	71
Critical pressure	bar	40.7	37.2
Latent heat of vaporisation (at 1,013 bar a)	kJ/kg	172.5	196
Specific heat at 25 °C			
• liquid	kJ/(kg.K)	1.25	1.64
• vapour (at 1,013 bar a)	kJ/(kg.K)	0.70	0.87
Flammability limits in air		none	none
ODP		0,34	0

FORANE® 507

What are the application fields for FORANE® 507?

FORANE® 507 is formulated for use in low temperature single stage applications (evaporation temperature $\geq -45^{\circ}\text{C}$) and is commonly used in commercial, transport and industrial refrigeration. Moreover, this refrigerant can be used in cascade,

multistage or liquid injection systems with good results. FORANE® 507 is also efficient at higher temperatures (up to $+15^{\circ}\text{C}$ evaporation) and allows the use of small displacement compressors.

When to use FORANE® 507?

Now.

R-502 is no longer produced in Europe and R-22 is or will be phased out in the future depending on the local regulations. An installation designed with

FORANE® 507 will reach the end of its life without needing a refrigerant change.

What does R-507 mean?

This number has been allocated to the FORANE® 507 blend by the ASHRAE standard 34. It denotes very precise characteristics such as the

nature and percentage of the blend components (see front page), as well as the manufacturing specifications.

Why choose a blend?

None single available component satisfies the equipment manufacturers' technical requirements.

Are there other replacements for R-22 in refrigeration and A/C?

In low and medium temperature refrigeration applications, R-22 has been successfully replaced by FORANE® 507 and FORANE® 404A (FX 70) with specific technical benefits.

In air-conditioning, FORANE® 134a serves as an R-22 alternative for equipment with relatively large refrigerating power (from 100 kW).

FORANE® 407C and FORANE® 410A replace R-22 for direct expansion air-conditioning systems. FORANE® 507 can also be applied in this kind of application where a water-cooled condenser is used (or when the outside temperature is moderate).

QUESTIONS ET ANSWERS

Is FORANE® 507 toxic or flammable ?

NO

FORANE® 507 offers excellent safety of use, like does R-502. It is classified A1 as per ASHRAE standard 34 (non flammable and non-toxic), and is

also UL approved as practically non flammable (the most severe flammability test applied in the industry).

What kind of oil is to be used with FORANE® 507?

As FORANE® 507 is based on HFCs, polyolester (POE) oils are used to ensure miscibility and good oil return to the compressor.

Is it possible to top-up the fluid during servicing?

YES.

FORANE® 507 is an azeotropic blend; therefore, maintenance practices are the same as with R-502.

Can FORANE® 507 be used in any type of equipment?

YES.

FORANE® 507 can be used in any kind of systems with evaporation temperature ranging from -45°C to

+15°C, for example in systems fitted with flooded evaporators or low pressure liquid receivers.

Can FORANE® 507 be used as a R-502 retrofit refrigerant?

FORANE® 507 can be used in recent R-502 systems with some modifications, including the change to a POE oil. However, Arkema

developed FORANE® FX 10 (R-408A) as a specific drop-in refrigerant with properties that exactly match those of R-502.

SATURATION TABLE

PRESSURE (bar a)	TEMPERATURE (°C)
1	- 47.4
1.1	- 45.4
1.2	- 43.5
1.3	- 41.7
1.4	- 40.1
1.6	- 37.0
1.8	- 34.2
2	- 31.7
2.2	- 29.3
2.4	- 27.2
2.6	- 25.1
2.8	- 23.2
3.2	- 19.6
3.6	- 16.4
4.0	- 13.4
5.0	- 6.9
6.0	- 1.3
7.0	3.6
8.0	8.1
9.0	12.1
10	15.8
12	22.4
14	28.2
16	33.5
18	38.3
20	42.6
22	46.7
24	50.5
26	54.1
28	57.4
30	60.6

PERFORMANCE COMPARISON

This performance comparison corresponds to a thermodynamic model, calculated using FORANE[®] software available free of charge on FORANE[®] pages (www.forane.com) of our web site.

Standard cycle : -40°C/+43°C, suction 18°C, sub cooling 10 K.

Variation with R-502	R-22	FORANE [®] 507
Δ Discharge temperature	+ 52 K	- 10 K
Refrigeration capacity	91 %	107 %
COP	100 %	99 %

The practical performance observed with FORANE[®] 507 depends on the type of equipment used, the refrigeration cycle and the ambient conditions.

Generally, the performance of FORANE[®] 507 is similar or better than R-502 and R-22 in an optimised system and there is no doubt, as technology improves, that FORANE[®] 507 equipments will soon be much more efficient than old CFC and HCFC ones.

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